GOVERNMENT OF ANDHRA PRADESH
ABSTRACT

ITE&C Department - Quantum Computing - Formation of Committee to arrive at a *"Clear Roadmap to position Andhra Pradesh as a hub for Quantum Computing"* - Orders - Issued.

INFORMATION TECHNOLOGY, ELECTRONICS & COMMUNICATIONS [ITE&C] (e-GOV) DEPARTMENT

G.O.Ms.No.10 Dated:19-12-2024
Read:

CMP No.746/Secy.(PPS)/2024. Dated. 26.11.2024 of the Secretary to the Honorable Chief Minister, and instructions of the Competent Authority

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ORDER:

The Government of India announced the **"National Quantum Mission"** on April 19, 2023 to advance quantum computing and related technologies in India. Leveraging this prop, the Honorable Chief Minister of Andhra Pradesh has instructed for *"...the preparation of a clear roadmap to position Andhra Pradesh as a hub for quantum computing. This includes examining the mission's objectives, identifying focus areas such as R&D centers, academic and industry partnerships, and fostering a startup ecosystem"*. A precis of the note on the "National Quantum Mission" is given at Annexure.

2. In the existing background which is layered with exciting opportunities for humankind but limited applications in e-Government, there is a need for an expert body comprising of professionals well-versed in the theoretical aspects of Quantum Computing, in the procurement aspects of information technologies hardware and software, in the application aspects of utilizing of quantum computing in Government for the benefit of the common man, and in the commercialization of deep technologies, including quantum computing.

3. Accordingly, Government, hereby, order the formation of a **"Committee for Quantum Computing"** for suggesting a *"clear Roadmap to position Andhra Pradesh as a hub for Quantum Computing"*:

1	Secretary, IT,E&C, (or) Nominee	Chairman
2	Managing Director, APTS Ltd.,	Convener
3	Chief Executive Officer, RTGS	Member
4	Representative of the IT association of Andhra Pradesh (ITAAP)	Member
5	Faculty from IIT, Tirupati (Computer science and Engineering)	Member
6	Faculty from IIIT, Nuzivid (Computer science and Engineering)	Member
7	Experts / Officials from Skill Development Department	Member
8	Experts / Officials from Industries and Commerce Department	Member

4. In addition, the Chairman of the Committee for Quantum Computing can co-opt additional members with domain expertise, as and when required and to render the Committee broad-based.

P.T.O.

5. The Committee Members shall submit a detailed road map outlining short-term, the medium-term, and the long- term strategies *"to position Andhra Pradesh as a hub for Quantum Computing"* by 31st January, 2025.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

N. YUVARAJ
SECRETARY TO GOVERNMENT

To
All the Members of the Committee

Copy to
1. The Secretary to Chief Minister, Chief Minister's Office, A.P. Secretariat
2. The OSD to Chief Secretary to Govt.,
3. The OSD to Hon'ble Minister for IT.
4. SF/SC (Computer no. 2646132)

//FORWARDED::BY ORDER//

SECTION OFFICER

Annexure on the National Quantum Mission (NQM)

"The National Quantum Mission (NQM), approved by the Union Cabinet on April 19, 2023, with a budget allocation of ₹6,003.65 crore for the period 2023-24 to 2030-31, aims to position India as a global leader in quantum technologies by fostering a robust research and development ecosystem.

A. Mission Objectives:

i. *Quantum Computing Development: The mission targets the development of intermediate-scale quantum computers with 50-1000 physical qubits over an eight-year period, utilizing platforms such as superconducting and photonic technologies.*
ii. *Quantum Communication Infrastructure: NQM plans to establish satellite- based secure quantum communications between ground stations across India, covering distances up to 2,000 kilometers. This includes long- distance secure quantum communications with other countries, inter-city quantum key distribution over 2,000 kilometers, and the creation of multi- node quantum networks equipped with quantum memories.*
iii. *Quantum Sensing and Metrology: The mission focuses on developing high-sensitivity magnetometers in atomic systems and atomic clocks for precision timing, communications, and navigation applications.*
iv. *Quantum Materials and Devices: NQM supports the design and synthesis of quantum materials, including superconductors, novel semiconductor structures, and topological materials, for the fabrication of quantum devices. Additionally, it aims to develop single-photon sources/detectors and entangled photon sources for quantum communications, sensing, and metrological applications.*

B. Implementation Strategy: *To achieve these objectives, NQM is establishing four Thematic Hubs (T-Hubs) in leading academic and national R&D institutions, each focusing on specific domains:*

a. *Quantum Computing*
b. *Quantum Communication*
c. *Quantum Sensing & Metrology*
d. *Quantum Materials & Devices*

These hubs are tasked with generating new knowledge through basic and applied research and promoting R&D in their respective areas.

C. Recent Developments:

i. *Establishment of Thematic Hubs: In October 2024, the Department of Science & Technology announced the selection of premier institutions to host the T-Hubs, marking a significant step in the mission's implementation.*
ii. *Guidelines for Startups: NQM has prepared detailed guidelines aimed at nurturing startups in the emerging field of quantum technologies, facilitating critical national and international partnerships to keep India at the forefront of technological advancements.*
iii. *International Collaborations: The mission is actively pursuing collaborations with leading global institutions to leverage expertise and accelerate progress in quantum research and development.*

D. ***Anticipated Impact:*** *NQM is expected to significantly benefit various sectors, including communication, health, financial services, and energy, with applications in drug design, space exploration, banking, and security. The mission aligns with national priorities such as Digital India, Make in India, Skill India, Stand-up India, Start-up India, and the Sustainable Development Goals (SDGs), aiming to elevate India's technological development ecosystem to a globally competitive level".*

The heart of the "Quantum computing" is the "Quantum bit or the Qbit" which serves the same function as the "Bit" (Binary digit) of the modern computer. The Bit exists in the 0 or the 1 state, while the "Qbit" can exist as 0, 1, or simultaneously as a combination of both 0 and 1 (a property called "entanglement" and "superposition"). This property of entanglement of the Qbit theoretically enables the quantum computer to perform computational tasks all at once, offering unparalleled speeds. Research studies however reveal that such "Quantum computing" requires expensive low temperature control to prevent the quantum states from "decoherence", which has severely constrained practical applications as on date.

As seen, established use cases of quantum computing in business, Government, and scientific research are few and far between. The best known is Peter Shor's 1994 demonstration that a quantum computer can solve the hard problem of finding the prime factors of large numbers exponentially faster than classical computers, which is used in cyber security.

N. YUVARAJ
SECRETARY TO GOVERNMENT